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for those five minutes of darkened time *millions of dollars were expended,* so important seemed the information they might give to the world of science."

TOTAL RADIATION FROM R AQUARII

On account of the presence of the nebular lines in the radiation of R *Aquarii* and the observations of nebulosity associated with it there is special interest in comparing its total radiation with that of other stars of class Md. Measures of the total radiation from R *Aquarii* were made with the vacuum thermocouple attached to the 100-inch Hooker telescope on August 26 and 28 under good observing conditions. The visual magnitude was estimated as 9.1. The measured radiometric magnitude was 2.57 and the water-cell absorption 2.2 magnitudes. The heat index was therefore 6.5 magnitudes. The last three quantities, which are corrected to the zenith, have been determined according to the definitions given in the June number of these PUBLICATIONS. These values of heat index and water-cell absorption are typical of advanced Md stars at minimum for which the heat index ranges from 6.5 to 8.3 magnitudes and the water-cell absorption from 1.6 to 2.2 magnitudes for the five stars which have been observed at this phase.

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THREE VARIABLE STARS AND A SUSPECTED NOVA IN THE SPIRAL NEBULA M 33 TRIANGULI

In the course of a search for novæ in M 33 in 1920, I found three faint variable stars in the following positions relative to the principal nucleus of the nebula:

No. 1.	250″ east,	90″ south
No. 2	360″ east,	65″ south
No. 3.	320″ west,	530″ north

Numbers 1 and 2 are involved in bright nebulosity. The approximate photographic magnitudes of comparison stars chosen near the variables were determined by comparison with stars of known magnitude on Kapteyn's Selected Area No. 45, which includes M 33 near its eastern edge.

Seventeen plates made at the Yerkes, Lick, Lowell, and Mount Wilson observatories, at intervals from 1899 to 1922, have been used for a study of these stars, but it has not been found possible in any case to deduce a period. The following table lists the plates used, and the estimated magnitudes of the stars.

			Estimated Magnitude		
Date	Observer	Instrument	Var. 1	Var. 2	Var. 3
1899, Sept. 12	Keeler	Crossley, Lick	18.5	16.2	<18.5
1902, Sept. 2	Ritchey	24-inch, Yerkes*	16.5	16	Invis.
1908, Nov. 17	Perrine	Crossley, Lick	17.0	16.2	17.0
1909, Sept. 10	Ritchey	60-inch, Mt. W.	17.4	16.5	18.2
1910, Aug. 5-7	Ritchey	60-inch, Mt. W.	16.5	16.3	17.8
1910, Oct. 24	Curtis	Crossley, Lick	16.8	16.5	17.9
1915, Oct. 30	Lampland	40-inch, Flagstaff	18.0	16.0	18.2
1915, Nov. 5	Curtis	Crossley, Lick	18.2	16.4	18.0
1916, Sept. 28	Lampland	40-inch, Flagstaff	18.4	15.0	18.0
1919, Aug. 26	Duncan	60-inch, Mt. W.	18.7	15.0	<18.5
1920, Aug. 12-14	Duncan	60-inch, Mt. W.	18.2	15.8	18.5
1920, Oct. 14	Duncan	100-inch, Mt. W.	18.2	15.8	<18.5
1921, Jan. 8	Duncan	60-inch, Mt. W.	18.2	15.2	<18.5
1921, Aug. 30	Lundmark	Crossley, Lick	17.8	15.0	<18.1
1921, Nov. 28	Lundmark	Crossley, Lick	18.2	15.0	18.0
1922, Jan. 20	Lundmark	Crossley, Lick	18.2	14.8	<18
1922, Aug. 24-26	Duncan	60-inch, Mt. W.	18.3	15.0	<18.5

*Half-tone reproduction used.

I am indebted to Mr. Knut Lundmark for the loan of the negative made with the Crossley reflector, and to Mr. C. O. Lampland for positive copies of his plates.

On the plate made with the 60inch reflector on August 24-26 of this year appears an object which cannot be distinguished from a star image, but which is not present on the other plates. It is 580″ north and 280″ west of the nucleus, near one of the comparison stars used for Variable No. 3, and appears to be of photographic magnitude 17.5. No opportunity has offered to obtain a check plate here.

John C. Duncan.